DETECTION LIMITS: Definition and Explanation of Terms

DHS' Sanitation and Radiation Laboratories Branch offers these definitions and explanations of terms:

- Method Detection Limit (MDL)—The MDL is the lowest concentration at which an analyte can be detected in a sample that does not cause matrix interferences (typically determined using spiked reagent water). "Detected" in this context means that a sample that contains the analyte detected at the MDL can be distinguished from a blank with 99% certainty. The MDL is a laboratory-specific number, dependent (among other things) on the instrumentation used by a particular laboratory and the skill of the operator. This number may change with time.

- Reporting Limit (RL)—The RL, as defined by DHS' Sanitation and Radiation Laboratories Branch, is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision. A criterion of ± 20% accuracy and 20% RSD for replicate determinations is often used to define "reasonable". The acceptable ranges depend somewhat on the analytical methodology used. For samples that do not pose a particular matrix problem, the RL is typically about three to five times higher than the MDL. Similar to the MDL, the RL is a laboratory-specific number, which may change with time. When a sample has to be diluted before analysis, either because of matrix problems or to get the instrument response within the linear dynamic range, the RL is raised by a factor corresponding to the dilution factor.

- Detection Limit for Purposes of Reporting (DLR) —The DLR is a parameter that is set by regulation for each reportable analyte. It is not laboratory specific and it is independent of the analytical method used (in cases where several methods are approved). The DLR cannot be changed by the laboratory. It is expected that a laboratory can achieve a Reporting Limit (RL, see above) that is lower than or equal to the DLR set by the State.

For finished drinking water it is unlikely that a sample poses such severe matrix interferences that a dilution that raises the RL above the DLR is required. If it appears that such a dilution is indeed necessary, the laboratory procedures should be carefully reviewed. In addition, alternative approved analytical methods, as well as sample cleanup procedures described within approved methods, should be considered.